

UNITED STATES PATENT OFFICE.

THOMAS A. EDISON, OF LLEWELLYN PARK, NEW JERSEY.

METHOD OF MAGNETICALLY SEPARATING ORES.

SPECIFICATION forming part of Letters Patent No. 485,841, dated November 8, 1892.

Application filed July 20, 1892. Serial No. 440,638. (No specimens.)

To all whom it may concern:

Be it known that I, THOMAS A. EDISON, a citizen of the United States, residing at Llewellyn Park, in the county of Essex and State of New Jersey, have invented a certain new and useful Improvement in Treating Iron Ores, (Case No. 957,) of which the following is a specification.

The object of this invention is to eliminate, practically, the sulphur from concentrated iron ores where the original crude ore contains magnetic pyrites.

Heretofore the crude ore in the form of large pieces and containing a large quantity of gangue has been roasted to accomplish the elimination of the sulphur; but this roasting process is an expensive one, and in addition the results obtained are far from perfect, since the pyrites on the interior of the lumps are protected from the oxidizing influence of the air.

In carrying out my invention the crude ore is first crushed to a sufficient degree of fineness to free the magnetic iron ore from the gangue and from the magnetic pyrites. The crushed ore is then passed through a magnetic separator which is sufficiently powerful to attract all the magnetic pyrites as well as the magnetic oxide of iron, thus eliminating the major portion of the non-magnetic gangue and leaving a concentrate composed of magnetic iron ore and magnetic pyrites with very little gangue. This concentrate is then passed through a second magnetic separator, which is graduated to such a magnetic strength that only the free particles of magnetic iron ore will be drawn away, leaving the magnetic pyrites and such particles of iron ore as have pieces of non-magnetic gangue—such as quartz—clinging to them. I have found that there is a sufficient difference in the specific magnetic capacity of the oxide of iron and the pyrites to allow of this differentiation. The iron ore obtained in this way as the product of this differential separation is free from sulphur. If the amount of iron in the tailings which result from the second separa-

tion is considerable, these tailings may then be roasted, so as to render the pyrites non-magnetic, and the magnetic iron ore can then be separated from the non-magnetic pyrites by passing the material through a magnetic separator, thus eliminating the whole of the pyrites, or the residue or tailings of the second magnetic separation may be recrushed to a smaller size, so as to free each iron-ore particle, when the difference in the magnetism of the pyrites and magnetic oxide can again be taken advantage of to separate the iron-ore particles from the pyrites particles by running the material through a magnetic separator of the proper strength to accomplish the differential separation, thus eliminating the whole of the magnetic pyrites without the necessity of roasting.

What I claim as my invention is—

1. The process of separating magnetic oxide of iron from magnetic pyrites where both occur in the same ore, consisting in subjecting the crushed material to magnetic action of such strength that, due to the difference in specific magnetic capacity of the oxide of iron and the pyrites, the oxide-of-iron particles will be acted upon, while the magnetic-pyrites particles will not be acted upon, substantially as set forth.

2. The process of treating ores containing magnetic oxide of iron and magnetic pyrites, consisting in first crushing the ore, then passing it through a magnetic separator of sufficient strength to separate the entire magnetic material from the non-magnetic gangue, and then passing the concentrated ore through a magnetic separator of such strength that, due to the difference in specific magnetic capacity of the oxide of iron and the pyrites, the oxide-of-iron particles will be separated from the pyrites particles, substantially as set forth.

This specification signed and witnessed this 9th day of July, 1892.

THOS. A. EDISON.

Witnesses:

RICHARD N. DYER,
EUGENE CONRAN.